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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/536,621	05/26/2005	Masahiko Nakamori	UNIU40.005APC	9275

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EXAMINER

MACARTHUR, SYLVIA

ART UNIT	PAPER NUMBER
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1792

NOTIFICATION DATE	DELIVERY MODE
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12/24/2008

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/536,621	Applicant(s) NAKAMORI ET AL.	
	Examiner Sylvia R. MacArthur	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 February 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4,7,8 and 10-22 is/are pending in the application.
4a) Of the above claim(s) 22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4,7,8 and 10-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 June 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 9/29/2008 has been entered.

Terminal Disclaimer

2. The terminal disclaimer filed on 8/1/2008 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of US application 10/598,717 has been reviewed and is accepted. The terminal disclaimer has been recorded.

Response to Arguments

3. It is noted that claims 1 and 12 were amended to recite that the length (D) in a diametrical direction is $\frac{1}{4}$ to $\frac{1}{2}$ relative to a diameter of a material to be polished. Applicant in the remarks found on page 5, paragraph 4 recite that Examples 6-9 provide data for the ratios of 0.28 and 0.49. However, no support was found in the specification. Subsequently, the examiner interprets this limitation as a matter of an intended use as the pad is claimed relative to the substrate which is not part of the apparatus. Recall, that the inclusion of material or an article worked upon by a structure being claimed, does not impart patentability to the claims. See *In re Young*, 75 F. 2d 966, 25 USPQ 69 (CCPA 1935). Furthermore, the prior art of Halley (US 6,361,647) illustrates in Fig. 1A that it is conventional to have a pad with a smaller diameter than the wafer, see also

col. 5 lines 29-39 wherein it is stated that the pad 140 radius is less than the radius of the wafer 10, typically around 20%. It is noted that Halley does not teach specifically the relative diameter of substrate of .25 -0.5, however, applicant has failed to show criticality of the range.

4. Halley does state that the diameter of the pad relative to the substrate can be greater or lesser, see col. 7 lines 15-24.

5. It is noted that in the non-final rejection of 12/10/2007 the prior art of Shimomura et al (US 2005/0064709) was used to anticipate claims 10, 11, 13, 18, 19, and 21 and used as a basis of obviousness in claims 2-4, 9, 12, and 20. However, in response to applicant's statement of common ownership in the paragraph joining pages 6 and 7 in the remarks of 2/28/2008, the examiner stated that she would withdraw the obviousness rejections, but inadvertently withdrew the anticipation as well. Also it was noted that the compression recovery range of 50-100% is also anticipated by Shimomura et al.

6. The anticipation rejections were reinvoked/introduced below.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

8. The applied reference has common inventors (Tetsuo Shimomura, Masahiko Nakamori, Takatoshi Yamada, Kazuyuki Ogawa, and Atsushi Kazuno) with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the

inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

9. Claims 1,7, 8, 10, 11, and 13-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Shimomura et al (US 2005/0064709).

The applied reference has common inventors with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131. Shimomura et al teaches grinding pad with a polishing region and a transmitting region the figures illustrates that the pad comprises characteristic iii), see [0085]. Section[0005] recites that it is conventional to construct the pad of polyurethane resin, [0012] of a foamed resin, the compressibility is discussed in [0042], closed cells of a specific average diameter in [0049] and [0063], the storage elastic modulus is discussed in [0072], the density of the foam is recited in [0076], the material of construction is recited in [0091]. Regarding claim 20: See the discussion of compression recovery in [0541] wherein it is stated that the compression recovery is 70% or more.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are

such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 1, 7, 10, 13, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi et al (JP 11-07517) in view of Halley (US 6,361,647).

See the English abstract and the Figure on the English Abstract of Takashi et al teaches a polishing pad with a polishing region and a light transmission region where the light transmission region is illustrated as being rectangular. The figure illustrates that the polishing pad comprises characteristic iii) and that the polishing side comprises groove. Takahashi et al fails to recite that the polishing pad according to claims 1, wherein a scatter of the thickness of the light-transmitting region is 100 μm or less. The examiner interprets that this claimed range also includes the case of no or zero scatter, suggesting the need to minimize the scatter, as motivated by the desire for more accurate detection and process control. Furthermore, the scatter of the thickness depends upon such process parameters as the material of construction and the shape of the transmitting region. Absent a showing of persuasive evidence that the particular shape is significant, the examiner opines that the shape of the transmitting region is a matter of design choice and well within knowledge and skill of one of ordinary skill in the art at the time of the claimed invention to optimize, see also *In re Dailey*, 357 f. 2d 669, 149 USPQ 47 (CCPA 1966). Applicant fails to provide a showing of the criticality of the actual percentages, these values can be optimized based upon such factors as the material of construction of the transmittance region and are known to effect the clarity of measurement and the overall endpoint measurement result, see *In re Aller*, 220 F. 2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed

invention to optimize the transmittance in the light transmitting region in order to optimize the measurement result in the recited wavelength ranges for use in CMP.

Takahashi fails to teach the length (D) is $\frac{1}{4}$ to $\frac{1}{2}$ of the diameter of the wafer. Applicant in the remarks found on page 5, paragraph 4 recite that Examples 6-9 provide data for the ratios of 0.28 and 0.49. However, no support was found in the specification. Subsequently, the examiner interprets this limitation as a matter of an intended use as the pad is claimed relative to the substrate which is not part of the apparatus. Recall, that the inclusion of material or an article worked upon by a structure being claimed does not impart patentability to the claims. See *In re Young*, 75 F. 2d 966, 25 USPQ 69 (CCPA 1935). Furthermore, the prior art of Halley (US 6,361,647) illustrates in Fig. 1A that it is conventional to have a pad with a smaller diameter than the wafer, see also col. 5 lines 29-39 wherein it is stated that the pad 140 radius is less than the radius of the wafer 10, typically around 20%. According to Halley the motivation to modify the conventional pad to be smaller than the substrate it treats is that it improves the degree of global uniformity. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to modify the conventional pad to be smaller than the substrate it treats is that it improves the degree of global uniformity. It is noted that Halley does not teach specifically the relative diameter of substrate of .25 -0.5, however, applicant has failed to show criticality of the range.

Regarding claim 10: Takahashi fails to teach the materials for forming the polishing region and light transmitting region are polyurethane resin. Nevertheless, polyurethane resin is a known material and used for its compliance, see col. 5 lines 17-38.

Regarding claim 13: Takahashi fails to teach that the pad does not have an uneven structure.

See the figures. The motivation to modify the pad of Takahashi is that allows for more uniform treatment of the substrate.

Regarding claims 18, 19, and 21: The hardness, compressibility and storage elastic modulus of the fine cell foam is an inherent property of the material chosen for the pad and is thus obvious as material of construction is the determining factor of the physical properties of the pad.

12. Claims 1-4 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hasegawa Toru (JP 2002-324770) in view of Halley (US 6,361,647)..

See the English abstract and the Figure on the English Abstract of Toru teaches a polishing pad with a polishing region and a light transmission region where the light transmission region is illustrated as being rectangular. The figure illustrates that the polishing pad comprises characteristic iii) and that the transmitting section also comprises light transmittance in the wavelength range of 400-800 nm. Toru fails to recite that the polishing pad according to claims 1, wherein a scatter of the thickness of the light-transmitting region is 100 μm or less. The examiner interprets that this claimed range also includes the case of no or zero scatter, suggesting the need to minimize the scatter, as motivated by the desire for more accurate detection and process control. Furthermore, the scatter of the thickness depends upon such process parameters as the material of construction and the shape of the transmitting region. Absent a showing of persuasive evidence that the particular shape is significant, the examiner opines that the shape of the transmitting region is a matter of design choice and well within knowledge and skill of one of ordinary skill in the art at the time of the claimed invention to optimize, see also *In re Dailey*,

357 f. 2D 669, 149 USPQ 47 (CCPA 1966). Applicant fails to provide a showing of the criticality of the actual percentages, these values can be optimized based upon such factors as the material of construction of the transmittance region and are known to effect the clarity of measurement and the overall endpoint measurement result, see *In re Aller*, 220 F. 2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to optimize the transmittance in the light transmitting region in order to optimize the measurement result in the recited wavelength ranges for use in CMP.

Toru fails to teach the length (D) is $\frac{1}{4}$ to $\frac{1}{2}$ of the diameter of the wafer. Applicant in the remarks found on page 5, paragraph 4 recite that Examples 6-9 provide data for the ratios of 0.28 and 0.49. However, no support was found in the specification. Subsequently, the examiner interprets this limitation as a matter of an intended use as the pad is claimed relative to the substrate which is not part of the apparatus. Recall, that the inclusion of material or an article worked upon by a structure being claimed does not impart patentability to the claims. See *In re Young*, 75 F. 2d 966, 25 USPQ 69 (CCPA 1935). Furthermore, the prior art of Halley (US 6,361,647) illustrates in Fig. 1A that it is conventional to have a pad with a smaller diameter than the wafer, see also col. 5 lines 29-39 wherein it is stated that the pad 140 radius is less than the radius of the wafer 10, typically around 20%. According to Halley the motivation to modify the conventional pad to be smaller than the substrate it treats is that it improves the degree of global uniformity. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to modify the conventional pad to be smaller than the substrate it treats is that it improves the degree of global uniformity. It is noted that Halley does not teach specifically

the relative diameter of substrate of .25 -0.5, however, applicant has failed to show criticality of the range.

Regarding claims 2-4:

The teachings of Toru and Halley were discussed above. The modification does not specifically state 50% or more/less of 80% or more/less, 90% or more, or 5% or less. However, since the claims are directed to a difference in transmittance, the initial and final values can be determined without undue experimentation. Applicant fails to provide a showing of the criticality of the actual percentages, these values can be optimized based upon such factors as the material of construction of the transmittance region and are known to effect the clarity of measurement and the overall endpoint measurement result, see *In re Aller*, 220 F. 2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to optimize the transmittance in the light transmitting region in order to optimize the measurement result in the recited wavelength ranges for use in CMP.

13. Claims 14, 16, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toru in view of Halley, as applied above, and in further view of Kouchiyu et al (JP 2001261874). The teachings of Toru as modified by Halley were discussed above.

Toru as modified by Halley fails to teach:

Regarding claim 14. The polishing pad according to claims 1, wherein a material for forming the polishing region is fine-cell foam.

Claim 16.: The polishing pad according to claim 14, wherein an average cell diameter of the fine-cell foam is 70 μm or less.

Claim 17: The polishing pad according to claims 1, wherein a specific gravity of the fine-cell foam is 0.5 to 1.0 g/cm.^{sup.3}.

The prior art of Kouchiyu et al teaches a thermoplastic elastomer made fine porous foamed body with the following physical properties that are advantageous for using in the design of polishing pad as they provide for an optimal pad capable of polishing a substrate while providing in-situ monitoring of the polishing process. See the English Abstract. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to use the material of Kouchiyu et al to construct the polishing pad. Note of Kouchiyu et al teaches a density of 0.2 to 1 g/cubic centimeter and an average cell diameter of 1 - 30 μm .

14. Claims 2-4, 12, and 20 are rejected under 35 U.S.C. 103(a) as being obvious over Takahashi (JP 11-07517) or Hasegawa Toru (JP 2002-324770) in view of Halley.

Regarding the compression recovery and the thickness of the transmitting region these are optimizable process parameters that can be determined without undue experimentation. These parameters are further a matter of design choice, such as size, shape and the material of construction and the wavelengths . Without a showing of critical of these parameters they are deemed obvious and well within the skill of one familiar with the construction of polishing pad as one of ordinary skill. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to modify the apparatus of Takahashi (JP 11-07517) or

Hasegawa Toru (JP 2002-324770) to construct a more optimal polishing pad by optimizing the parameters stated above.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ono et al (US 2006/0148391) teaches a polishing pad with a hardness in the Shore D harness of 3 or more. The pad is made of polyurethane resin other components see page 14 [0233]. Other properties such as compressibility and compression recovery are also discussed.

Takeda teaches foams made of polyurethane resin. Takeda discusses compressibility and compression recovery.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sylvia R. MacArthur whose telephone number is 571-272-1438. The examiner can normally be reached on M-Th during the hours of 8 a.m. and 4:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

December 17, 2008

/Sylvia R MacArthur/
Primary Examiner, Art Unit 1792